Features

- Thin 11mm angle/position sensor with 4-wire harness and connector offered as a standard assembly
- Dual output, durable magnetic circuit, Hall IC technology
- Long life of 30 million cycles
- Dual output detection settings configured at factory to meet user’s requirements
- Waterproof as standard with an IP64 rating
- Resistant to dither input, temperature variables, vibration impact and other external environmental factors
- Built-in magnet shield reduces interference from external magnetic field and isolates sensors from magnetic noise found in nearby motors
- 0.16W power rating
- Low impedance allows low load resistance
- Blind shaft-fitting design for front insertion of a blade shaft
- Popular screw mount flange with two oval mounting holes (hardware not included)
- RoHS compliant

Applications

- Dual angle/position detection in electronically controlled devices found in automobiles, construction/agricultural machinery, snowmobiles, and marine vessels
- Various actuators such as valve opening/closing detection
- Dual outputs offer flexibility, i.e. redundancy and back-up, clamp voltage range, or indicator/control systems
- Other applications for dual output angle/position sensors requiring reliability and very long life

Specifications

Basic Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>5 ± 0.5V</td>
</tr>
<tr>
<td>Supply Current</td>
<td>32mV max.</td>
</tr>
<tr>
<td>Power Rating</td>
<td>0.16W</td>
</tr>
<tr>
<td>Mechanical Rotational Angle</td>
<td>130°</td>
</tr>
<tr>
<td>Electrical Rotational Angle</td>
<td>100.8° (0.4V to 4.6V)</td>
</tr>
</tbody>
</table>

Output Characteristics

- Output Inclination: 0.042V/degree
- Output Resolution: 5/4096V (Vdd/12 bit)
- Mounting Hole Pitch: 36mm

Operating Temperature Range

- −40°C to +125°C

Significant Characteristics

- Output Linearity: ±1% before test; ±2% after test; (in percentage of F.S. measurement range); deviation of output voltage from referenced straight line (inclination of 0.042V/degree) connecting 0.4V to 4.6V (see Figure 1)
- Hysteresis: ±0.5° before test; ±0.5° after test; results based on difference of output voltage from hysteresis loop (origin curve and return curve)
- Relative Deviation: 5 ± 0.08V before test; 5 ± 0.1V after test; to calculate relative deviation use ΔV = V1 + V2 where V1 is main output and V2 is sub-output
- Output Noise: ±0.2% F.S. before test, ±0.2% F.S. after test
- Insulation Resistance: 100MΩ min. before test; 10MΩ min. after test; 500VDC, MEGA between each lead and shaft fitting
- Operating Torque - Minimum: 0.0049N•m min. before test; 0.0010N•m min. after test (see Figure 3)
- Operating Torque - Maximum: 0.0588N•m max. before test; 0.0883N•m max. after test (see Figure 3)
Endurance Performance

Operating Endurance

<table>
<thead>
<tr>
<th>Operating Temperature (°C)</th>
<th>Tested Rotational Cycles</th>
<th>Tested Operating Angle</th>
<th>Output Voltage Range (V)</th>
<th>Frequency Rate (Hz)</th>
<th>Applied Voltage To Vcc Connector Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>+25</td>
<td>30 million</td>
<td>100.8°</td>
<td>0.4 to 4.6</td>
<td>4</td>
<td>5V</td>
</tr>
<tr>
<td>+125</td>
<td>10 million</td>
<td>100.8°</td>
<td>0.4 to 4.6</td>
<td>4</td>
<td>5V</td>
</tr>
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<td>0.4 to 4.6</td>
<td>4</td>
<td>5V</td>
</tr>
<tr>
<td>+125</td>
<td>100 million</td>
<td>5°</td>
<td>2.4 to 2.6</td>
<td>30</td>
<td>5V</td>
</tr>
</tbody>
</table>

Sweep Vibration 2.5V reference point at +25°C, 30G, 50-250Hz, X, Y, Z direction, 12 hours

Shock 100G, 3 minutes, 18 times

Humidity 80 ± 3°C, 95 ± 5%RH, 1,000 hours

Temperature Cycle – 40°C for 1 hour ± +125°C for 1 hour, 1,000 cycles

Low Temperature Shelf Life – 40°C, 1,000 hours

High Temperature Shelf Life +125°C, 1,000 hours

Moisture, Rain, and Spray JIS-D0203-D1, temperature of water shall be 10°C lower than temperature of test sample D1 dip test time: 5 minutes, 10 cycles (installation side of part is sealed using an assembly tool)

Electromagnetic Susceptibility 200 V/m, 1MHz to 1GHz

Electrostatic Discharge ±8kV contact discharge; ±15kV air discharge; IEC-61000-4-2

Output Analysis

Figure 1: Output Characteristics
**RSM012 Series**

**Dimensions**

**Dimensional Drawings of Front View A with Wire Harness and Connector**

Unit: mm

![Dimensional Drawing](image)

**Electrical Schematic**

*Figure 2: Measurement Circuit*

![Electrical Schematic](image)
RSM012 Series  Dimensions

Dimensional Drawings of Back, Side, and Bottom Views

Unit: mm

Rotational Torque

Figure 3: Operating Torque

- Rolling in 5V Position (Maximum Torque)
- Returning to 0V Position (Minimum Torque)
- Initial Position of Rotor

Tolerance: ± 0.5 (unless otherwise specified)
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